WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE
BUREAU OF BIOLOGICAL SURVEY
UNITED STATES DEPARTMENT OF AGRICULTURE

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Washington, D. C. No. 2 January, 1936

COMMENTS ON WILDLIFE REVIEW

Brickbats (?): Addressed by a few as Wildfire Review, perhaps inadvertently.

Constructive suggestion: An author index in each issue and at end of year. It will be done.

Bouquets: Samples from a large assortment (excluding, however, those from members of the Biological Survey):

"An excellent idea" (or words to that effect). Numerous correspondents.

"Fine, most valuable." S. Prentiss Baldwin, Cleveland, Ohio.

"This is splendid, and much appreciated." Paul J. Fair, Berkeley, California. Similar remark from Miles D. Pirnie, Kellogg Bird Sanctuary, Michigan; P. S. Lovejoy, Ann Arbor, Michigan, and others.

"It's a success." H. M. Wight, School of Forestry and Conservation, Ann Arbor, Michigan.

"It is useful, timely, and very much worth while." E. C. O'Roke, same organization.

"A fine service; congratulations on your first issue." R. B. Hunter, Fish and Game Service, Vermont.

"This is the finest service ever and I heartily congratulate the Bureau upon so helpful and constructive an innovation." James Moffitt, San Francisco, California.

"In my opinion this is an excellent move, and one that fills a long-felt need. It will give added impetus to the wildlife research that the Bureau is sponsoring and to that done elsewhere. Permit me to compliment you on the timeliness of this undertaking." Rudolf Bonnitt, Associate Professor of Zoology, University of Missouri.

"I wish to congratulate you on the initiation of a publication which is bound to be of the greatest value to those interested in game conservation and wild life, the country over. One of the great difficulties in following this literature is its scattered nature and the fact that some of it appears in highly technical journals and many articles appear in journals which the technical worker would completely overlook. The publication is bound to have a great influence on the development of the work along these lines." Wm. A. Riley, University of Minnesota, University Farm, St. Paul, Minnesota.

"This is a great contribution and needed." William C. Adams, Conservation Department, Albany, New York.

"Congratulations on your first number of the WILDLIFE REVIEW. This is a swell job!" Seth Gordon, Secretary, American Wildlife Institute.

"I want to shoot along my congratulations on 'The Wildlife Review'. This is something that has long been needed and I think you have done a swell job with your first number. This is a publication that will be extremely useful." William Vogt, Editor of Bird-Lore.

"I am sure that WILDLIFE REVIEW will be a most useful publication to all persons working in the general field of conservation." T. H. Frison, Chief, Natural History Survey, Urbana, Illinois.

"We feel that this publication will be very valuable to those who are working in the field of wildlife management." Arthur L. Clark, Supt., Connecticut State Board of Fisheries and Game.

"This explanatory review concentrates a scattered field of material and saves the men in the field valuable time and energy." Clarence Pautzke, State Biologist, Seattle, Washington.

"This is fine stuff. Of much value to us who are engaged in teaching game and ecological research." W. J. Hamilton, Jr., Cornell University, Ithaca, New York.

"Wildlife Review will be a wonderful help in carrying on work in my two districts." Frank R. Rost, U. S. Forest Service, Virginia, Minnesota.

"The publication will be of much interest and help to the several branch stations under the Southwestern Forest and Range Experiment Station." Arthur Upson, Director, Tucson, Arizona.

"I was delighted to obtain copies of your new publication for distribution among the Forests in this Region and am of the opinion that it is decidedly worth while. Wildlife Review should fill an important place in educating those interested in wildlife management and in keeping them informed concerning recent publications of value from a wildlife management standpoint." R. M. Evans, Regional Forester, Washington, D. C.

"I have examined with much interest the first issue of the REVIEW and feel sure that it will prove most useful to all of us interested in wildlife administration. Your thoughtfulness in making it available to us is greatly appreciated." George M. Wright, Chief, Wildlife Division, National Park Service.

"Let me take this opportunity to express appreciation of the outstanding value of Wildlife Review to all who are concerned with wildlife management. The harassed field man, who usually experiences the greatest difficulty in squeezing surveys of current literature into his program, is going to find the Wildlife Review absolutely indispensable." E. Lowell Sumner, Jr., Regional Wildlife Technician, National Park Service, San Francisco, California.

"Please accept my congratulations on the very excellent publication 'Wildlife Review'. It is perhaps the thing we have needed most in our wildlife work for several years past. Certainly if future copies contain the same amount and kind of information as was contained in the first copy every investigator will find it indispensable." Ralph T. King, Instructor, Economic Zoology, University of Minnesota.

"I received the first copy of Wildlife Review, and think that it should prove to be very useful to the various workers in the field. x x x I like the concise, clear way in which you sum up the significant essentials of each paper and give the reader something of an idea as to contents, in case he wishes to look up the original." Paul L. Errington, Research Asst. Professor, Iowa State College.

"Let me congratulate you on the game management reviews. This will prove most useful to all game managers who desire to keep up to date. In addition to getting the many references, we will enjoy the brief comments, as well as profit by them." Herbert L. Stoddard, Director, Cooperative Quail Study Association, Thomasville, Georgia.

"Wildlife Review is the most significant publication I have received in many months. The Biological Survey is to be congratulated on this contribution to field men working with game. The editor's comments are especially pertinent and should be enlarged, upon occasion, for the gist of his critical examination may be of as much importance as the paper reviewed." Wallace Grange, Baileys Harbor, Wisconsin.

"Issue No. 1 of 'Wildlife Review' has been carefully read from cover to cover, and I can assure you that its appearance has been welcomed with great enthusiasm, not only by myself, but by our entire biological staff. Such a publication is invaluable in keeping our field men, who are widely scattered and generally remote from library facilities, posted on the latest developments in wildlife management. From the very beginning of wildlife activities in the Soil Conservation Service, we have felt the need for a publication devoted exclusively to wildlife management, and, if you recall, I have been urging this very thing for a long time. You may know, therefore, that your service in conducting the 'Wildlife Review' is meeting a very keen need of the Soil Conservation Service and is deeply appreciated." Ernest G. Holt, In Charge, Wildlife Conservation, Washington, D. C.

ABSTRACTS

Biological Survey: Annual Report, 1934-1935

Darling, J. N. Report of the Chief of the Bureau of Biological Survey, 1935 (Biological Survey, Washington, D. C.), 51 pp., 1935.

Account of the work of the Bureau not intended primarily for presentation of detailed findings. Touches upon many things related to wildlife management. Research on big-game mammals, on forest wildlife, waterfowl food resources, food habits, relationships of predators and upland game birds, crow-duck relationship, and diseases are illustrative headings. The refuge program, the big-game preserves, and predator control activities are among other things discussed.

Conservation: Education

U. S. Office of Education. Conservation of natural resources, Outlines of instruction for educational advisers and instructors in Civilian Conservation Corps Camps. U. S. Dept. Interior, C.C.C. Vocational Ser. 7 (U. S. Dept. Interior, Washington, D. C.), 94 pp., 1935.

This one of a series of outlines of instruction for C.C.C. camps is devoted to Conservation of natural resources. Another, No. 8, has the subject, Forestry. Chapters of No. 7 of interest in the present connection are on The Value of Wildlife, Agencies which Aid in the Conservation of Wildlife, The Organized Movement for Wildlife Conservation, and much of a section entitled Conservation of Natural Resources. Pertinent literature is listed.

Conservation: Needs of antelope

Gabrielson, Ira N. The antelope situation, American Game (Investment Bldg., Washington, D. C., 25 cents a copy), 24(4), July-August 1935, pp. 54, 59, 2 figs.

Antelope have increased in recent years and several good-sized herds exist. Refuge facilities are described and the need stressed for an unfailing year round food supply for the animals.

Conservation: Regulated take; reservations

Dymond, J. R. Problems in the conservation of game and fur-bearing mammals, Proc. Fifth Pacific Science Congress, Canada, 1933 (Univ. of Toronto Press), 5, 1934, pp. 4077-4078.

The necessity of preserving suitable conditions for the various species, and of regulating take so as to maintain optimum populations. Regulation should be based on adequate knowledge of life histories and fluctuations in numbers. The zone system of trapping (assignment of rights on a certain area to a single trapper) has worked well in British Columbia. Need of making nature reserves; if not done "there are many natural phenomena which we may never discover, much less understand".

Cycles: Disease as a factor

Green, Robert G. The periodic disappearance of game birds, Minn. Conservationist (State Office Bldg., St. Paul, Minn., 15 cents a copy), 29, Oct. 1935, pp. 2-3, 19, 4 photos.

"The ebb and flow of annual populations is a natural process now being referred to as a cycle." Discussion of the animals exhibiting cyclic phenomena in Minnesota. "The most logical explanation of the periodic die-off of resident animals is the development of epidemic disease." Notes on the diseases; ulcerative enteritis "incriminated as a major factor" in grouse destruction. Good management as an aid in recovery.

Cycles: Forecasting

Elton, Charles. Fluctuations in wild animal populations, Quart. Journ. Forestry (48 Dover St., London, W. 1, England, 2 shillings, 6 pence a copy) 29(3), July 1935, pp. 194-198.

A popular account of "cycles" in wild animal populations in relation to man. "It is already possible to forecast vole damage in Scotland, fox production and lynx production in Canada."

Disease: Aspergillosis in propagated wild turkey chicks

Durant, A. J. and C. M. Tucker. Aspergillosis of wild turkeys reared in captivity, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill., 40 cents a copy), N. S. 39(6), June 1935, pp. 781-784, 3 figs.

Of 785 poults on a Missouri State Game Preserve, fewer than 200 survived infection by Aspergillosus fumigatus from a commercial feed. The feed contained cod-liver oil and fish meal and was a good medium for development of the mold. "The report suggests the importance of using freshly prepared feeds, especially during the highly susceptible period of growth."

Disease: Botulism

Kalmbach, E. R. Will botulism become a world-wide hazard to wildfowl?, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill., 40 cents a copy), N. S. 40(2), Aug. 1935, pp. 183-187, 2 figs.

Review of occurrence of botulism in North and South America and especially in Australia. There the causative organism seems to be a different strain of Clostridium from that identified with the disease in America. Bibliography of 6 titles.

Disease: Parasites

Cameron, T. W. M. Parasites carried by wild animals of importance to man and domestic animals, Twenty-eighth Convention Internat. Assoc. Game, Fish, and Conserv. Commrs., 1934 (578 Madison Ave., New York, N. Y.), 1935, pp. 79-83.

General account of the principal parasites of wild animals, their interchange with domestic stock, and their importance to man.

Disease: Tularemia

Gerstell, Richard. Concerning tularemia, Pennsylvania Game News (Board of Game Commissioners, Harrisburg, Pa., 5 cents a copy), 6(10), Jan. 1936, p. 6.

General account, animals affected, symptoms in humans, prevalence in Pennsylvania. Of 44 human cases on record in the State, 19 were contracted from handling of rabbits shot in the wild and 23 from dead rabbits shipped into Pennsylvania from western States for market purposes. The article argues for low infection rate of native rabbits, yet Pennsylvania has imported and released thousands of western rabbits, which if infected at a higher rate must have increased prevalence of tularemia in the State.

Ecology: Bird census method

Breckenridge, W. J. A bird census method, Wilson Bul. (Morningside College, Sioux City, Iowa, 60 cents a copy), 47(3), Sept. 1935, pp. 195-197, 1 graph.

By enumerating those encountered on compass lines about 150 feet apart and followed at right angles on alternate traverses. Adapted to learning total population and its disbribution over the census area.

Ecology: Clean-up work

Brandenburg, Araminta A. and Louis W. Campbell. The effect of certain relief projects on bird life, Wilson Bul. (Morningside College, Sioux City, Iowa, 60 cents a copy), 47(3), Sept. 1935, pp. 240-241, 1 table.

Clean-up work by the C.W.A., etc., reduced the number of birds' nests in Swan Creek Valley, Toledo, Ohio, by 87 percent in three years.

Ecology: Food shortage

Gerstell, Richard. Pennsylvania deer. Are they becoming gradually smaller?, Pennsylvania Game News (Board of Game Commissioners, Harrisburg, Pa., 5 cents a copy), 6(7), Oct. 1935, pp. 10-11, 18-19, 6 photos.

Deer in certain areas apparently decreasing in average weight in a period of fifteen years. I breeding and unbalanced sex ratio rejected, scarcity of food in the affected regions, favored, as an explanation. Cut-over lands coming up to miscellaneous brush once provided ample food which later sapling growth decreased. Protective measures caused an increase of deer at the same time that the food supply was decreasing.

Ecology: Overgrazing

Barker, Elliott. Overgrazing, Twenty-eighth Convention Internat. Assoc. Game, Fish, and Conserv. Commrs., 1934 (578 Madison Ave., New York, N. Y.), 1935, pp. 28-30.

Description of the situation and recommendations. "The very great majority of all our grazing areas, including the National Forests, have at some time undergone a period of excessive use by livestock, resulting in serious damage and reduced carrying capacity. Subsequent examinations and inspections often result in erroneously attributing the damage to game animals, which in reality were not responsible for the original damage at all."

Ecology: Overpopulation

Anon. Deer - New Zealand's Enemy No. 1, Forest and Bird (Forest and Bird Protection Soc., P. O. Box 631, Wellington, N. Z. No price quoted), 37, August 1935, pp. 3-5, 4 photos.

Deer devour undergrowth thus preventing regeneration, and spoil the forest floor thus bring on erosion. "A great campaign to save the vitally necessary forests is far more important to the Dominion than anything else that is visible in the Government's programme."

Ecology: Overpopulation

East, Ben. Starvation stalks Isle Royale moose, American Forests (1713 K St., N. W., Washington, D. C., 35 cents a copy), 41(8), Aug. 1935, pp. 370-372, 399, 3 photos.

Account of trapping and transfer of live moose to the Michigan mainland. Losses through starvation were about one-third in each of the winters 1933-1934 and 1934-1935. Results of overbrowsing described and illustrated. Further trapping and shooting suggested as means of keeping the herd within bounds.

Ecology: Saltwater tolerance of wigeongrass

Bourn, W. S. Sea-water tolerance of Ruppia maritima, Contr. Boyce Thompson Inst. (Boyce-Thompson Institute for Plant Research Inc., Yonkers, N. Y.), 7(3), 1935, pp. 249-255, 1 graph.

In greenhouse cultures plants thrived in concentrations of sea water of from 0 to 80 percent normal ocean strength and remained healthy for three months in those up to 150 percent. "These results led to the conclusion that Ruppia maritima L. might be used advantageously in most coastal waters to replace Zostera marina L., which in recent years has almost completely disappeared from the Atlantic Coast." This conclusion must be viewed in the light of other limiting factors besides salinity of which wave action may be important in delimiting the ranges of these two plants.

Economics: Value of Canadian fur-bearers

Anderson, R. M. The distribution, abundance, and economic importance of the game and fur-bearing mammals of western North America, Proc. Fifth Pacific Science Congress, Canada, 1933 (Univ. of Toronto Press), 5, 1934, pp. 4055-4075, 17 figs. (range maps), 2 tables.

Brief accounts of the principal species; the Canadian take of furs for 1930-31; the annual value of raw fur production from 1920 to 1931 (10 to 18 million dollars yearly); present state of protection. "In some areas the natives would not be able to live unaided if the game were gone. A few dollars counted in the statistics may not mean much to persons 'outside' the

fur country, but the small sum may mean the ammunition supply for an Indian family which has no income except from hunting and trapping, or the small amount of flour and tea needed to keep the family from starvation. A small catch of weasels, mink, skunks, and muskrats by a poor settler on marginal lands may form an important element of the family budget during a bad year for crops, prices, or labour, and provide the small amount of cash to purchase needed staple supplies that cannot be raised on the land."

Food Habits: Coyote

Murie, Olaus J. Food habits of the coyote in Jackson Hole, Wyo., U. S. Dept. Agr. Circ. 362 (Supt. of Documents, Washington, D. C., 5 cents a copy), 24 pp., 2 tables, Oct. 1935.

Report on analyses of 64 stomach contents and 714 samples of feces collected over a four year period. One tabulation shows identifications, frequency of occurrence, and percentage of occurrences of food items, field mice and pocket gophers ranking well above any others. Another table classifies the food items into groups according to whether their destruction was beneficial, neutral, or harmful from the standpoint of man. "70.29 percent may be credited to the animal as indicating economically beneficial feeding habits; 18.22 percent may be classed as neutral, and only 11.49 percent may be charged against the coyote. x x x The balance is overwhelmingly in favor of the coyote in this locality."

Food Habits: Hawks in Connecticut

Anon. Connecticut Hawks - what they look like in the air, National Assoc. Audubon Societies (1775 Broadway, New York, N. Y.). Poster, printed information on back. 1935.

Reproduction of 15 of Peterson's flight silhouettes from the May hawk book and on the reverse a tabulation showing the proportions of 8 species in the hawk population of Connecticut, and graphically illustrating their food.

Food Habits: Hawks in Minnesota

Breckenridge, W. J. A new deal for Minnesota's hawks, Minn. Conservationist (Dept. of Conservation, State Office Bldg., St. Paul, Minn., 15 cents a copy), 30,, Nov. 1935, pp. 8-9, 12, 15, 5 figs., 1 table.

An original contribution to knowledge of the economic relations of Minnesota hawks based on approximately 275 stomach analyses. Of the 7 common species, only the sharp-shinned and Cooper's hawks are judged more detrimental than beneficial.

Food Habits: Hawks in Pennsylvania

Luttringer, Leo A., Jr. Hawks - What they eat, Nature Magazine (1214 - 16th St., N. W., Washington, D. C., 35 cents a copy), 26(3), Sept. 1935, pp. 173-175, 177, 3 photos.

Essentially a summary of the stomach contents of 1101 Pennsylvania hawks of 11 species. A remarkably large number (438) of goshawks reported upon. Nearly half of the total number of stomachs of all species collected were empty or unfit for stomach analysis. This article with the addition of a tabulation of results presented in Warren's "Birds of Pennsylvania" was reprinted in rearranged form and unpaged (4-page folder) by the National Association of Audubon Societies (1775 Broadway, New York, N. Y.).

Food Habits: Owls in Minnesota

Breckenridge, W. J. Science judges the owl, Minn. Conservationist (Conservation Commission, St. Paul, Minn., 15 cents a copy), 31, Dec. 1935, pp. 5-6, 16, 4 photos.

General sketch of 10 species occurring in Minnesota with report on 98 stomach analyses. Only the great horned owl is considered an economic liability. The snowy and screech owls are perhaps neutral and the others more beneficial than injurious.

Food Habits: Methods of presenting data

Mohr, Carl O. Value of prey-individual analysis of stomach contents of predatory mammals, Journ. Mamm. (W. H. Burt, Museum of Zoology, University of Michigan, Ann Arbor, Mich., $1.00 a copy), 16(4), Nov. 1935, pp. 323-324.

Contention that the numerical system of dealing with stomach contents of predatory mammals is superior to the volumetric. This debate has been carried on for an indefinite period. A combination method seems not only desirable but also necessary as certain classes of food are not countable.

Food Habits: Winter food of deer in Massachusetts

Hosley, N. W. and R. K. Ziebarth. Some winter relations of the white-tailed deer to the forests in north central Massachusetts, Ecology (Prince and Lemon Sts., Lancaster, Pa., $1.25 a copy), 16(4), Oct. 1935, pp. 535-553, 5 tables.

This report is based chiefly on studies carried on in the town of Petersham, Mass., which included both field observations and stomach analyses. Account of results is preceded by description of the region, its winter weather, and vegetation. Cover types are discussed and the occurrence in them indicated of the 11 most important species of deer food. These are apple, dwarf raspberry, ground hemlock, wintergreen, red maple, black cherry, hemlock, hazelnut, staghorn sumac, red oak, and pasture juniper. Field observations on deer feeding

are tabulated, and red maple is indicated as the most important browse species. A table is given of food items found in 24 stomachs of which apple (fruit) is greatly predominant (61%). Bedding preferences and habitat changes are discussed and suggestions made as to forestry practice that may improve deer range. Bibliography of 12 titles.

Life Histories: California quail

Sumner, E. Lowell, Jr. A life history study of the California quail, with recommendations for its conservation and management, Part I, California Fish and Game (Fish and Game Commission, 450 McAllister St., San Francisco, Calif., 25 cents a copy), 21(3), July 1935, pp. 167-256, 15 figs., 12 tables.

A study independent of the Sporting Arms and Ammunition Manufacturers group but inspired by and modeled after them. Cooperative between the Division of Fish and Game and the University of California. The first or life history installment treats food habits and requirements, water requirements, and general ecological requirements. Green food was found quite important and legumes the most utilized family of plants. Tables itemize the foods according to months for 102 adult and 14 young quail. Numerous matters associated with food and feeding are discussed. The need for water controversy is disposed of by the finding that although the quail can live, and produce and rear young when water is only indirectly available, in the arid country typically inhabited by the species, such availability is governed by the distribution of surface water supplies, near which, and only there, do the birds nest in a state of nature. Good interspersion of cover and food and some available form of water are basic ecological requirements.

The effects of human activities upon quail seem mostly inimical. Life-history studies are reported on under the headings of calls, social organization, covey formation and range, courtship, care of young, growth and behavior of young, general behavior of adults, mortality, population studies, weight changes and plumages. The contents of Part I are summarized, pp. 251-256. Part II, in press, will be abstracted later.

Life Histories: Hawks

May, John B. The hawks of North America, National Assoc. Audubon Soc. (1775 Broadway, New York, N. Y., $1.25 a copy), 140 pp., 36 col. pls., 4 wash pls., 23 tables, 33 maps.

A thoroughly and beautifully illustrated and concise but comprehensive account of the hawks of America north of Mexico, with special attention to their economic value. Numerous small maps illustrate the ranges and tabulations summarize the results of examinations of stomachs and crops published by various authorities. An appendix summarizes State laws relative to hawks. There is an 8-page bibliography but no index.

Life Histories: Hungarian partridge

Leopold, Aldo. Review of Zur Biologie des Rebhuhns by Dr. W. Nolte, Wilson Bul. (Morningside College, Sioux City, Iowa, 60 cents a copy), 47(4), Dec. 1935, pp. 300-303.

The findings of the original, a compilation of hunters' reports and weather data, are succinctly given in 36 numbered paragraphs. The worst predators were cats and dogs, all native forms being relatively harmless. "The welfare of the partridge is directly proportional to sunshine, warmth, and dew, and inversely porportional to rainfall."

Life Histories: Porcupine

Taylor, Walter P. Ecology and life history of the porcupine (Erethizon epixanthum) as related to the forests of Arizona and the southwestern United States, Univ. Ariz. Bul. (University of Arizona, Tucson, Ariz.), 6(5), July 1935, 177 pp., 9 pls., 18 figs., tables.

Studies of the author dating back to 1924, work of other Biological Survey men, and supplementary information from the literature competently compiled. Distribution and physical traits of the porcupine, food habits especially in relation to trees, breeding habits, enemies, parasites, and wanderings are treated. Suggestions are given on capturing and handling the animals, on caring for them in captivity, and on methods of control. There is a full bibliography but no index. Clearing away of forest growth, and overgrazing, diminishing the food supply of the porcupine have been important factors in bringing about destructive feeding by the animal. The suggestion is made that sound management in many cases may obviate the necessity for destroying injurious animals. "The need for porcupine control operations may perhaps fairly be regarded as a kind of measure of man's inefficiency in dealing with nature." Under existing conditions, however, damage is serious. "There is little difficulty in maintaining a forest if one has virgin timber to start with; but in heavily cutover tracts one can scarcely be sure of getting anything."

Life Histories: Sex ratio in ducks

Furniss, O. C. The sex ratio in ducks, Wilson Bul. (Morningside College, Sioux City, Iowa, 60 cents a copy), 47(4), Dec. 1935, pp. 277-278, 1 table.

Observations on the breeding grounds in Saskatchewan on 14 species; range of proportions of the sexes in these species, male:female, 1:1 to 3.4:1; average 1.6:1.

Management: Beaver in relation to trout

Salyer, J. C., II. A program of beaver management. Recommended for the maintenance of both beaver and trout in Michigan, American Game (Investment Bldg., Washington, D. C., 25 cents a copy), I, 24(3), May-June 1935, pp. 39, 47-48, 4 photos; II, 24(4), July-August, 1935, pp. 55, 62-64, 6 photos.

Part I contains suggestions for control by trapping, and Part II, control by blowing out dams, frequency of beavers to be tolerated, and general suggestions. The suggestions are for comparatively flat country where beaver ponds collect silt, and not for mountainous areas. Destruction of dams there is wholly without justification and is not for the welfare of trout.

Management: Bobwhite

Stoddard, Herbert L. Cooperative Quail Study Association Fourth Ann. Rep. (Thomasville, Ga.), 20 pp., Sept. 1935.

Matters of general interest include sections on controlled burning, on experiments with cover and food plants, on volunteering of plants valuable on game range, on fire ant and disease studies, and on experiments with "red" quail.

Management: Cover plants

Anon. Woody plants of Iowa recommended for game cover, Iowa State Planning Board (Des Moines), 18 pp., 1 table, 4 figs., 1935. Mimeographed.

Cover types and plants valuable in providing each; table showing hardiness, soil requirements, and methods of planting 20 groups of cover plants, and text giving descriptive notes and suggestions on propagation and transplanting.

Management: Demonstration projects

Gordon, Seth. Quail demonstrations become lighthouses of knowledge on wildlife restoration, Twenty-eighth Convention Internat. Assoc. Commrs., 1934 (578 Madison Ave., New York, N. Y.), 1935, pp. 38-44.

The value of research in game management but particularly of application of the results. Principally an account of cooperative quail management demonstrations instituted by the American Game Association, the Biological Survey, and various individuals and organizations in Oklahoma, Arkansas, Tennessee, South Carolina, North Carolina, and Indiana. Noteworthy plans or results are noted for four of the projects. Similar information is given for Iowa State demonstrations.

Management: Farmer-sportsman relationships

English, P. F. Northwest Kent game management area, American Wildlife (formerly American Game, Investment Bldg., Washington, D. C., 25 cents a copy), 24(5), Sept.-Oct. 1935, pp. 71, 79-80, 4 photos.

Account of a year's operation of a sportsman-farmer-department game management plan in Kent County, Mich. Notes on organization, policy, steps taken to improve conditions as planting feed patches and food-producing shrubs. Recommendation as to wild plants to be spared on farms.

Management: Furbearers

Hamilton, W. J., Jr. The fur-bearers of New York in their relation to agriculture, Cornell University (Ithaca, N. Y.), Ext. Bul. 319, 25 pp., 9 figs., 4 tables, March 1935 (rec'd Sept. 26).

Value of furs in the nation and in New York State; "the bulk of trapped fur-bearers are taken by the farmer or by one of his family"; general account of the food habits of skunk and weasel; use of fur-bearers for food; need for greater protection of the animals; suggestions on trapping, and on care of pelts.

Management: Herd reduction

Childs, F. W. Management of the Yellowstone elk, American Wildlife (formerly American Game, Investment Bldg., Washington, D. C., 25 cents a copy), 24(5), Sept.-Oct. 1935, pp. 69, 77-78, 2 photos.

Description of methods by which a predetermined reduction of some 3000 head was accomplished.

Management: In German forests

Shepard, Ward. Notes on German game management, chiefly in Bavaria and Baden, Senate Document, 73rd Congress, 2nd Session (Senate Special Committee on Conservation of Wild Life Resources, Washington, D. C.), 16 pp., tables, 1935.

This report containing information very desirable for American wildlife managers and foresters treats game management in the State Forests, including protection, care, and feeding of game, density of stocking, policy relating to predatory animals, game statistics, game revenue, training of personnel, and game research. "Conclusions" call attention to phases of German game management from which lessons may be drawn for American application.

Significant sentences: "it is a principle of the Bavarian Forest Service that game production must be as great as the supply of game feed and the prevention of undue injury to forests and farms will permit." "Game

management in all its phases (from feeding to killing) is undertaken directly by the forest service." "The fundamental fact of game management in German State Forests is simple, direct, absolute quantitative and qualitative regulation of kill." "There is now a strong reaction against the pure spruce forest in favor of mixed growth x x x strongly influenced by the difficulty of feeding an abundant supply of game where there is little natural browse or grass." "The general principle followed in German game management is to hold the predatory animals in reasonable check and to afford the game animals special protection against them." "Predatory animals are shot or taken in traps. The use of poison is, as a rule, not resorted to, and is regarded as unethical." "Of the total forest receipts, the income from game is forty-four hundredths of 1 percent, a fact that strikingly demonstrates the relatively unimportant economic value of game as compared with its scientific and recreational value."

Management: In National Parks

Borell, A. E. Preservation of wildlife in National Parks of Southwest is big problem, New Mexico (208 W. Gold Ave., Albuquerque, N. M., 15 cents a copy), 13(11), Nov. 1935, pp. 30, 31.

"Predators, rodents, reptiles, and amphibians have just as much right to Park Service attention as does big game." "The biologist realizes that artificial feeding fosters weak and sick animals, reduces stamina and wariness, interferes with natural migration, attracts predators, and that concentration of animals facilitates the spread of disease." The Southwest badly overgrazed but on a certain National Monument with grazing eliminated there "is a fine stand of mesquite and creosote bush, and dense undergrowth is waist high. Here we find numerous Gambel quail, cottontails, many other rodents and hundreds of birds; a decided contrast to the surrounding area". Notes on treatment of springs.

Management: In National Parks

Wright, George M. Big game of our National Parks, Scientific Monthly (Lancaster, Pa., 50 cents a copy), 41(2), Aug. 1935, pp. 141-147, 6 photos.

General account with the following management items: Hemorrhagic septicemia in Yellowstone bisons was controlled by inoculating the entire herd with an especially prepared vaccine; a thousand feral burros eliminated from Grand Canyon to improve conditions for bighorn sheep. Remark on feeding Yellowstone elk, "elk, like human beings, are not improved by being pauperized".

Management: New England forest wildlife

Hosley, N. W., et al. The essentials of a management plan for forest wildlife in New England, Journ. Forestry (839 Seventeenth St., N. W., Washington, D. C., 65 cents a copy), 33(12), Dec. 1935, pp. 985-989.

Report of Subcommittee on fish and game management, New England Section, Society of American Foresters. For the area to be managed, a description, history, and type map are needed; the probable carrying capacity, present stock, and limiting factors should be learned; and plans made for improvement with respect to food, cover, and other wildlife essentials. Bibliography of 6 titles.

Management: Planting to feed wildlife

Westveld, R. H. and J. L. Van Camp. Forest planting on Michigan farms, Mich. State College (East Lansing, Mich.) Extension Bul. 147, 44 pp., 13 figs., 3 tables, October 1935.

The value of vegetation to wildlife is given considerable prominence. A list of trees for forest planting specifies use as food and cover for birds and deer and indicates utilization by a few other forms of wildlife. In a tabulation of shrubs and vines, utilization by game birds and by the cottontail rabbit is shown.

Management: Ruffed grouse

Fremack, Harriet. Ruffed grouse research, The Du Pont Magazine (E. I. Du Pont de Nemours & Co. Inc., Wilmington, Del.), 29(11), Nov. 1935, pp. 10-11, 23, 4 photos.

This article is welcome for news of the Minnesota Ruffed grouse investigation which has been rather hard to get. Notes are given on annual counts of birds on the Cloquet area which revealed cyclic fluctuation. Normal carrying capacity is one grouse to four acres and the cruising radius of an individual bird is about a half mile. Methods of marking the birds for recognition in the field are described. Chipmunks remove eggs from nests but do not eat them. The article is marred by propaganda to the effect that "Prohibiting shooting will not solve the problem" of ruffed grouse maintenance. While shooting may be tolerated during the higher stages of ruffed grouse numbers, it might prove excessively destructive during the lows. If shooting be regarded as an implement for smoothing the curve of fluctuations, it can be so used only during the highs. During the lows, it could only make them lower and is something that should be controlled or even prohibited during that phase of the cycle.

Management: Waterfowl

Pirnie, Miles D. Michigan waterfowl management (Mich. Dept. Conservation, Lansing), 328 pp., frontis. + 212 figs. (photos), 14 tables, 2 maps, 1935.

This is the first American work comprehensively devoted to waterfowl management. Accounts are given descriptive of birds of this group occurring in Michigan and their habits, with special attention to nests, eggs, and downy

young, and to migration and dispersal. Chapters are devoted to The Status of Waterfowl, Natural Enemies (including diseases), Waterfowl Hunting, The Management Idea, Laws and Regulations, Refuges and Sanctuaries, The Duck Food Problem, Planting Programs, Propagation and Restocking, Predator Control, and Restoration Keys to fifty common aquatic plants of Michigan and a tabulation of the contents of several score crops and gizzards form an appendix. Something over six pages are devoted to a bibliography and there is a good index.

"The aims of waterfowl management in Michigan may be summed up as follows

1. To inventory Michigan waterfowl, both nesting and migrant.

2. To evaluate the destructiveness of the gun, predators, diseases, and all other known destroyers of waterfowl in Michigan.

3. To develop a plan for waterfowl protection, increase, and more wide-spread use and appreciation.

4. To improve conditions for waterfowl, especially in connection with such other projects as water storage and fish and fur production.

5. To consider Michigan waterfowl questions and programs as a part of and not apart from the national waterfowl situation."

The method of treatment of the subject matter of the book is realistic and reasonable. The discussions of ecological conditions in relation to aquatic plants, and of the subject of predation, are especially good.

Characteristic conclusions: "Opinions are easier to get than are the essential facts as to waterfowl conditions" (p. 62). "It is very likely that the adverse effect of drought on waterfowl as a whole has been a bit exaggerated" (p. 65). "Circumstantial evidence tends to exaggerate the numbers of waterfowl of all ages that are killed by predatory birds and mammals" (p. 68). "Evidently seasons longer than five or six weeks will result in too great a kill of most kinds of ducks under present conditions of waterfowl concentrations and under existing hunting methods" (p. 114). "If waterfowl are steadily decreasing, past protection must have failed of its purpose" (p. 120). "Duck foods are neither as scarce nor as limited in distribution as is frequently claimed" (p. 185). "The best carp producing areas of Michigan x x x continue to be important feeding grounds for waterfowl" (p. 195). "The value of wide-spread predator control in Michigan has not been demonstrated" (p. 261). "No matter how successful or extensive future restoration programs may be, we cannot afford to neglect improved protection programs" (p. 289).

Management: Winter food supply

Dalke, Paul D. Shrubs for game and other birds, American Wildlife (formerly American Game, Investment Bldg., Washington, D. C., 25 cents a copy), 24(5), Sept.-Oct. 1935, p. 70, 1 table. Also published as Game Management Circ. 1, Conn. State Board of Fisheries and Game, Hartford.

Discusses methods of propagating and gives a table containing scientific and vernacular names, and season of fruiting of 28 species of especial value as winter food in Connecticut.

Predators: On quail eggs

Lehmann, Valgene. The relation of predators to quail increase, Twenty-eighth Convention Internat. Assoc. Game, Fish, and Conserv. Commrs., 1934 (578 Madison Ave., New York, N. Y.), 1935, pp. 36-38, 5 tables.

The season when eggs are in the nest the weakest point in life history of the bobwhite. One hundred "dummy" nests containing actual quail eggs were set up in four localities of which 97 were destroyed by various predators, the leading ones of which were hog, 19 percent; armadillo, 18; fox, 13; and skunk, 13. The armadillo is a highly insectivorous animal and the finding of quail nests is "purely accidental". The animal being common, however, the "accidents" are frequent. "Not a single young quail was hatched in the areas where we conducted our study prior to our departure on July 1." Lehmann's observations and experiments seem to "prove too much" as he says the observational tracts "were selected because both quail and predators were present in goodly numbers".

Predators: Relative to wildlife populations

Dymond, J. R. What of the predator?, Proc. Fifth Pacific Science Congress, Canada, 1933 (Univ. of Toronto Press), 5, 1934, pp. 4079-4080.

Speculation as to relation of predators to cyclic phenomena. In the absence of predators, populations increase and may suffer from food shortage or disease. "It is impossible to eliminate the predator without ultimate injury to the health, vigour, and other desirable qualities"of species.

Predators: Vermin campaign in West Virginia

Reese, Albert M. The destruction of "vermin", Science (Lancaster, Pa., 15 cents a copy), 82(2138), Dec. 20, 1935, pp. 593-594, 1 table.

Presents a tabulation of 191,511 animals killed as "vermin" in 26 counties of West Virginia in a year. Among them are 79,481 snakes, 13,497 water dogs, 15,370 turtles, 4,417 terrapins, 18,089 chipmunks, showing indiscriminacy of the campaign.

Propagation: Artificial incubation and brooding

Weisner, E. S. Artificial incubation and brooding of game birds, Mich. Agr. Exp. Sta. Quarterly Bul. (East Lansing, Mich.), 17(3), Feb. 1935, pp. 113-116, 1 table. Also issued as a separate, pp. 1-4, 1 table.

Account of adoption of these methods, equipment, and results for 7 species of game birds.

Propagation: Bobwhite

Barron, Frank, Jr. Pen-raising the bobwhite, Modern Game Breeding (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 5(12), Dec. 1935, pp. 4-5, 1 photo.

A stock account of methods used on a West Vriginia game farm; nothing novel.

Propagation: Brooder house

Le Compte, E. Lee. Bob-white - our most aristocratic game bird, Twenty-eighth Convention Internat. Assoc. Game, Fish, and Conserv. Commrs., 1934 (578 Madison Ave., New York, N. Y.), 1935, pp. 32-36.

Mainly an account of a large brooder house intended to make possible production of bobwhites throughout the year.

Propagation: Cock quail as brooders

Klose, William F. What! No brooder?, Modern Game Breeding (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa.), 5(11), Nov. 1935, pp. 4-5.

Experience with the use of surplus cocks in brooding and rearing California Valley quail. Economical, increases the percentage of successfully reared birds, eliminates risk of infection by poultry diseases. Description of equipment and methods.

Propagation: Ducks, semi-artificial

Lincoln, Frederick C. Raise ducks!, Field and Stream (578 Madison Ave., New York, N. Y., 25 cents a copy), 40(6), Oct. 1935, pp. 34-35, 63-65, 2 photos.

Sparse returns from banded mallards released from game farms indicate the birds scarcely become incorporated with the wild waterfowl population. One and one-half percent return contrasted with a normal expectancy of from 20 to 25 percent. Comment on the Flanders duck, a hybrid mallard x black which seems to do better. Description of nesting shelters.

Propagation: Feed formulas

Smith, E. C. Fall and winter pheasant feed, Pennsylvania Game News (Board of Game Commissioners, Harrisburg, Pa., 5 cents a copy), 6(7), Oct. 1935, p. 6.

Two formulas for fall and winter, and for the breeding period, respectively, composed of different proportions of cracked corn, wheat, buckwheat, kaffir corn, and sunflower seed.

Restocking: Trapping and shipping mountain sheep

Hume, B. B. Mountain sheep round-up, Outdoor Life (353 Fourth Ave., New York, N. Y., 15 cents a copy), 76(4), October 1935, pp. 20-21, and 51 5 photos.

Description and photographs of trap and account of capture and transportation of 20 specimens (Wyoming).

WILDLIFE RESEARCH AND MANAGEMENT LEAFLETS

Additional numbers of interest to wildlife managers are listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of Agriculture, Washington, D. C.

BS-19. Plants valuable for wildlife utilization and for erosion control, by W. L. McAtee, October 1935, 11 pp.

Lists genera of plants valuable to wildlife as cover, browse, herbage and as mast, fruit, and seed producers. Catalogs plants of these categories that have been recommended for use in erosion control.

BS-26. Directions for poisoning piñon jays, 2 pp., November 1935.

BS-27. A cage trap useful in the control of white-necked ravens, by S. E. Aldous, January 1936, 4 pp., 1 fig.

Notes on range, characters, and economic relations of the raven, with plans, specifications and instructions for building and operating the trap.

SPECIAL ARTICLE

The Biological Survey in relation to game management*

Accepting Leopold's definition that "Game Management is the art of making land produce sustained annual crops of wild game for recreational use", it seems probable that participation in game management by the Biological Survey will be only limited and qualified. The principle has already been established that on National Forests the function of the Survey is research and planning. The Forest Service will conduct the actual operations, which, according to definition, constitute game management. Since lands controlled by the Biological Survey itself are so largely inviolate sanctuaries, game management upon them will be of a qualified type in that there will be no harvesting of annual crops for recreational use unless overflow is so considered.

* Prepared in December 1934 only to which date the figures cited are valid. In 1935 field inspections were carried on as before and the cooperative work referred to in the next succeeding article was organized.

It can be said without reserve, however, that game management is the application, with respect to the species concerned, of knowledge about wildlife, its environment, and the improvement thereof, the gathering and dissemination of which have long been major activities of the Biological Survey. Among studies of the Bureau, results of which are ready for immediate use, are investigations of the classification, distribution, and migrations of animals, of their ecological inter-relations, disease, and of methods of reducing the numbers of certain species locally objectionable. From the beginning emphasis was placed on food habit studies, and with reference to this line of work, Stoddard in the Third Annual Report of the Cooperative Quail Study Association (November 1934) says "This Division is of vital importance to sportsmen and wild life lovers of the entire country," (p. 3). Leopold in a letter of December 3, 1934 writes "none of the work with which I am connected would have been possible without the cooperation of the Survey in stomach analyses and banding."

Stoddard is our foremost working game manager and Leopold our leading exponent of its philosophy. By their complimentary references, they mean that the general knowledge developed by the Biological Survey is of fundamental value to game managers, and that the assistance of the Bureau in identifying food plants, seeds, and other material, and of making analyses of the stomach contents of game species, their competitors, and predators, is of the greatest practical assistance in connection with game management problems.

Because some do not know the fact, and others may have forgotten, it may well be recalled that Stoddard learned game management as an employe of the Biological Survey. He knew nothing of it when he came to us but was selected for his good biological background, his personality, and his demonstrated liking for arduous field work. He was an employe exclusively of the Biological Survey from January 1924 to September 1930, during which period the Cooperative Quail Investigation and the reports upon it were carried to completion and the Biological Survey's cooperation with Research Fellows of the Sporting Arms and Ammunition Manufacturers' Institute was practically completed. These Research Fellows, namely, Yeatter, Errington, King, and Gorsuch, constitute what may well be called the Nation's first graduating class of game managers and their accomplishments were certainly greatly facilitated by Biological Survey assistance.

In subsequent years, Stoddard has worked intermittently for the Bureau on game management projects outside of the area of the Cooperative Quail Investigation - experience which cannot have failed materially to broaden his knowledge.

The final report of the Cooperative Quail Investigation, a 600-page book on "The Bobwhite Quail, Its Habits, Preservation, and Increase", published in 1931, is one of the two most outstanding publications in the game management field, the other being Leopold's textbook. The quail book is distinctly a Biological Survey and a Department of Agriculture product. The work was done and the book written by Survey men under Bureau appointment and supervision and was collaborated in by representatives of other Bureaus, especially by

those of the Zoological Division of the Bureau of Animal Industry. The Misses Cram, Jones, and Allen of that Division did both field and laboratory work and furnished an excellent chapter on Internal Parasites and Parasitic Diseases, and Chas. O. Handley, an employe of the Biological Survey even prior to Stoddard's appointment, participated in most of the investigation and is joint author of chapters on Food and Feeding Habits and on Quail Preserve Development and Management. Clarence Cottam organized the former chapter including in it the results of considerable laboratory work by himself and by F. M. Uhler. E. R. Kalmbach made field studies for, and prepared, the colored illustrations adorning the work. W. L. McAtee edited and re-edited every paragraph of the book more than once as did also the Bureau Editor, W. H. Cheesman. Although the Quail Book was published by an outside concern, we must not forget, nor allow others to forget, that it is just as much a Biological Survey production as if it had appeared in some official series. The work is recognized as laying the foundation of practical upland game bird management in this country.

Leopold says that "the technique of altering range for greater productivity x x x is the principal subject" (p. viii) of his textbook, and this subject which he evidently considers the core of game management is one with which, aside from the Quail Investigation, the Biological Survey has worked for many years. W. L. McAtee began the inspection of wild fowl habitats and the making of recommendations for their improvement in 1908, and subsequently he and other members of the Bureau have made hundreds of similar inspections and reports. Study and recommendations relative to upland areas began some years later and have continued to the present time, Stoddard being specially engaged for numbers of them.

To 1934, inclusive, publications of the Biological Survey devoted to environmental improvement number four in the waterfowl class and ten bearing on upland game management; two publications on winter feeding of game birds have been issued.

Publications on food habits giving the general background of knowledge so essential to the game manager have numbered two relative to waterfowl, dealing with all of the shoal water ducks except one (the shoveller), and six relating to upland game birds, including all but the band-tailed pigeon.

Regional reports on food resources for waterfowl have been published relating to the Bear River Marshes, the Sandhill Region of Nebraska, and the State of North Dakota, and manuscripts awaiting publication deal with Missouri, Minnesota, Wisconsin, and Montana.

The propagation of game birds, sometimes a necessity for providing seed stock, has been dealt with in three Farmers' Bulletins and five other publications.

Unofficial articles have kept pace in number with official documents and have treated almost all phases of game management. No fewer than ninety or about 22.5 percent of the publications cited in the bibliography of Leopold's "Game Management" are by Biological Survey employes. In April 1934, there were listed 46 official publications of the Bureau, 6 unpublished manuscripts, and 27 unofficial articles, dealing with wildlife management, that had been prepared

by members of the Division of Food Habits Research alone.

The Biological Survey has participated in every significant move that has been made looking to the establishment of game management in this country. This Bureau organized and carried to satisfactory completion the Cooperative Quail Investigation that was the inspiration of the whole series of subsequent investigations in various parts of the country, it actively cooperated in every one of the researches in game management sponsored by the Sporting Arms and Ammunition Manufacturers' Institute, it cooperated with the American Game Association in the organization and conduct of several Experimental Quail Management Projects, and it has cooperated in the Iowa Conservation Plan, and in projects inaugurated in Michigan by Professor Wight and in Wisconsin by Leopold. The Survey has made food analyses for the New England and the New York Ruffed Grouse Investigations, the Wisconsin Prairie Chicken Study and others on quail in New Mexico and California. It has lent its assistance in advice, field inspections, and recommendations in connection with Wildlife Management on the Soil Conservation Projects, has made special inspections and reports for the Tennessee Valley Authority, the Forest Service, and others. The Bureau has furnished material for, and read in manuscript or proof, practically all of the publications that have been issued by More Game Birds in America, although it must be said that not all of our suggestions have been accepted. Various members of the Biological Survey read part or all of the manuscript of Leopold's textbook on Game Management and he makes acknowledgment to seven of them.

To sum up: since the Biological Survey has had a part in practically all game management movements, however sponsored, its part probably has been greater than that of any other one organization. In other words, the Bureau has done its full share in the light of the emphasis that has been placed on game management in the period reported upon, and it is now continuing in the forefront of the movement by inauguration of cooperative research and demonstrational projects at several land grant colleges.

Game management involves size-up of the environment including its soil and water supply, its plants and animals, and their habits, tolerances, diseases, distribution, movements, and abundance; it requires maintenance of environmental conditions when they are favorable, and improvement when they are not, objectives involving planting, clearing, controlled burning, fertilization, cultivation, in fact almost the whole gamut of agricultural and silvicultural operations; it contemplates the measurement of game populations and their productivity, and regulation of the kill. There are no first steps that can be taken and forgotten; no, there must be continuous attention to all phases of the subject. To this point the specifications agree with Leopold's definition of game management as the "art of making land produce sustained annual crops of wild game for recreational use". The definition must be extended, however, if it is to cover the modern demand that these annual crops be marketed to provide revenue or even a profit.

The undertaking is vast, comprehensive, complex, and there seems to be no instance in which game management has been carried on with attention to all parts of the program outlined, nor of continued success as a self-supporting or profit-making endeavor. Locally it has been demonstrated that revenue can be derived from the disposal of hunting privileges, but it has not been shown either in this country or elsewhere that intensive game management can be carried on as a business undertaking, all costs figured in, and made to yield profits.

The foremost students and practitioners of game management admit that the whole subject is in an elementary stage, vastly in need of more data in almost every direction, and suffering greatly for lack of the guidance of technical studies and scientific experimentation.

In view of the state of the matter as here disclosed, and of limitations upon the functions of the Biological Survey, it seems that aside from the refuge program, and in part there, the Bureau can serve game management best as a research organization. It can aid now in preliminary surveys and recommendations, the quality of which will steadily improve with growth in pertinent knowledge and in the specific experience of those doing the work, and it can perform essential services in identifying a great variety of material and in making food analyses. It can continue the production of reference works, containing detailed information on animals, their diseases, foods, cover, and general ecology, and on the enumeration, study, and regulation of animal populations, that are vitally necessary to the game manager.

The Biological Survey, collectively, knows as much, or more, about game management than any other single group, but it also knows that the greatest need of the subject and one which it is eminently proper for a government Bureau to supply is for more and still more research, the results to be passed on to all concerned as rapidly as practicable. In relation to game management, research is the Bureau's proper field and it should be cultivated diligently.

To end with another quotation from Leopold, the State should be "the leader rather than the doer in game matters."

INAUGURATION OF COOPERATIVE WILDLIFE RESEARCH AND DEMONSTRATION PROJECTS

Cooperative agreements, each running for five years, have been entered into with a land grant college and the conservation commission in eight States, under which research and demonstration in wildlife management will be carried on. Each unit will undertake a major research problem, will assist in finding solutions to technical problems arising in wildlife administration, cooperate with management demonstration of locally important species, and carry on extension and educational work as may be feasible. The projects are being supported by contributions from the land grant college (a third), the State game department (a third), and the Biological Survey and the American Wildlife Institute (together a third).

The locations selected for inauguration of the work, the men assigned, and brief statements of their education and experience, are herewith recorded.

Alabama Polytechnic Institute, Auburn.

Harold S. Peters.

Ohio State University B.Sc., 1925; M.Sc., 1926; assistant in entomology 1925-1926; U.S. Bureau of Entomology and Plant Quarantine, corn borer research, 1924, 1925; assistant entomologist, 1928-1935; Virginia Truck Experiment Station, assistant entomologist, 1926-1928; George Washington University, instructor in entomology, 1933-1934; Biological Survey, associate biologist, 1935-

Member, American Association for the Advancement of Science, American Ornithologists' Union, American Association of Economic Entomologists, Entomological Society of Washington, Ohio Academy of Science, Sigma Xi.

Principal papers: Mallophaga of Ohio birds; Ectoparasites and bird-banding; External parasites collected from banded birds; A list of external parasites from birds of the eastern part of the United States.

Connecticut State College, Storrs.

Paul D. Dalke.

University of Michigan BSF, 1925; MSF, 1928; Ph.D, 1934; U.S. Forest Service, summer employment, 1922, 1925; technical foreman, 1933-1934; University of Michigan, junior instructor, 1928-1931; research fellow in wildlife management, 1931-1933; National Park Service, ranger naturalist, 1929; Connecticut Board of Fish and Game, director of game management, 1934-1935; Biological Survey, associate biologist, 1935-

Member, American Association for the Advancement of Science, American Society of Mammalogists, Society of American Foresters, American Wildlife Association, Sigma Xi, Phi Sigma.

Principal papers: Dropping analysis as an indication of pheasant food habits; Carrying capacity of pheasant range; Food habits of young pheasants; Food habits of adult pheasants; Economic status of the pheasant in Michigan.

Iowa State College, Ames.

Logan J. Bennett.

Central College BS, 1930; Iowa State College MS, 1932; wildlife research, 1931-1934; Iowa Fish and Game Department, game technician, 1934-1935; E.C.W. camp, game technician, 1935; Biological Survey, associate biologist, 1935-

Member, Gamma Sigma Delta, American Ornithologists' Union, Wilson Ornithological Club, Iowa Ornithologists' Union, Cooper Ornithological Club, Ecological Society of America.

Principal papers: Lost legions; Midwest duck breeding grounds; Iowa duck studies, all as joint author with Paul L. Errington; A comparison of two Iowa duck nesting seasons; The 1934 spring migration of shore birds through Clay and Palo Alto Counties, Iowa.

Maine: State University, Orono.

Clarence M. Aldous.

Utah Agricultural College BS, 1917; University of Minnesota MS, 1923; Extension Service, U. S. Department of Agriculture, county agent, rodent control, 1919-1921; Instructor High School, Idaho, biological science, 1924-1925; Utah 1925-1928; Coalville High School, vocational agriculture and biology, 1928-1929; Biological Survey, junior biologist, rodent control, 1929-1930; assistant biologist, research in forest wildlife, 1931-1935; associate biologist, 1935-

Member, American Society of Mammalogists, Wilson Ornithological Club, Society of American Foresters.

Principal papers: The possibilities of the Red Lake Wildlife Refuge; Are all hawks and owls detrimental?; Seasonal food habits of snowshoe hares; Breeding habits of snowshoe hares; Migrations and homing instincts of snowshoe hares.

Oregon State College, Corvallis.

Arthur S. Einarsen.

University of Washington BS, 1924; U.S. Bureau of Fisheries, field assistant, 1922, 1923; Washington State Department of Fisheries, in charge of biological work, 1923-1933; Washington State Game Department, assistant director and biologist, 1933-1934; Fisheries Association, Seattle, Wash., biologist, 1934; U.S. Forest Service, inspector detailed to the Biological Survey in connection with game management in National Forests, 1935; Biological Survey, deputy U.S. game management agent, 1934, 1935; associate biologist, 1935-

Member, Pacific Northwest Bird and Mammal Society, American Ornithologists' Union.

Principal papers: The black brant in Washington State; Economic factors in the saltwater rearing of salmon; Perpetuating herring by conservation; Contributions to the diet of fur seals.

Texas Agricultural and Mechanical College, College Station.

Walter P. Taylor.

University of California BS, 1911; Ph.D, 1914; assistant curator of mammals, 1909-1911, curator, 1911-1916; Biological Survey, assistant biologist, 1916-1924; biologist, 1924-1928; senior biologist, 1928-

Member, Phi Beta Kappa, Sigma Xi, American Association for the Advancement of Science, Biological Society of Washington, American Ornithologists' Union (Fellow), Cooper Ornithological Club, American Society of Mammalogists, American Society of Ichthyologists and Herpetologists, California Academy of Sciences (Fellow), Ecological Society of America (President, 1935), Executive Secretary, California Associated Societies for the Conservation of Wildlife (1912-1916); Member, U. S. Department of Agriculture Committee on Federal Migratory Bird Regulations 1914-1916; Member, Committee on Ecology of Grasslands, National Research Council 1932-1934.

Principal papers: Mammals of the Alexander Nevada Expedition of 1909; Field notes on amphibians, reptiles, and birds of northern Humboldt Co., Nevada; The problem of aquatic adaptation in the Carnivora; Description of a new subgenus of Phenacomys; The status of the beavers of western North America; The vertebrate zoologist and national efficiency; Revision of the genus Aplodontia; The Yellowstone elk herds; Suggestions for ecologic investigations in vertebrate zoology; A distributional and ecological study of Mount Rainier, Washington; Life history of the kangaroo rat (with Charles T. Vorhies); Upland game birds in the State of Washington; The present status of the band-tailed pigeon on the Pacific Coast; The basic importance of life history studies; Relation of wild birds to the foot and mouth disease (with H. C. Bryant); The biological side of the business of forest and forage production; Mammals and birds of Mount Rainier National Park; The emergence of the biology of forest and range; How shall we handle our surplus deer?; Provisional list of land mammals of the State of Washington; Research as a basis for wildlife management in the southwestern United States; Methods of determining rodent pressure on the range; The life histories and ecology of jack rabbits in relation to grazing in Arizona (with Charles T. Vorhies); Some animal aspects of reforestation and erosion control; Significance of extreme or intermittent conditions in distribution of natural resources; Some animal relations to soils; Ecology and life history of the porcupine as related to the forests of Arizona and the southwestern States; The significance of biotic communities as related to ecological studies.

Utah Agricultural College, Logan.

D. Irvin Rasmussen.

Brigham Young University BS, 1928; University of Illinois M.S., 1930; Ph.D, 1932; Illinois State Natural History Survey, aquatic biological investigations, 1932; wildlife research, 1932-1933; U.S. Forest Service, game management studies, 1929, 1930, 1931; recreational education, 1933; range research, 1934-1935; Utah Agricultural College, wildlife management, 1935; Biological Survey, associate conservationist, 1935-

Member, Phi Sigma, Sigma Xi.

Principal papers: Wildlife and the public domain; Southern California Balanus-Littorina communities; Animal communities of Kaibab Plateau.

Virginia Polytechnic Institute, Blacksburg.

Charles O. Handley.

Washington and Lee University BS, 1922; instructor in biology, 1922-1923, 1923-1924; Virginia Commission of Game and Inland Fisheries, research and educational work, 1928-1935; Biological Survey, assistant in food habits research, 1922, 1923; field assistant in the Cooperative Quail Investigation, 1924-1929; associate conservationist, 1935-

Member, American Ornithologists' Union, Wilson Ornithological Club, Cooper Ornithological Club, Virginia Society of Ornithology (President).

Principal papers: Food habits of the bobwhite quail; Bobwhite quail propagation; Ruffed grouse propagation; Survival of liberated quail; Bobwhite quail preserve management.

NOTES AND NEWS

In the recent reorganization of the Soil Conservation Service, U. S. Department of Agriculture, Secretary Wallace has approved the establishment of a separate unit in the Division of Conservation Operations to integrate a program of wildlife encouragement with operations for soil conservation on the various projects of the Service throughout the country. This is a conservation development of major importance, for the reason that through 139 demonstration projects and the work areas of 501 CCC camps the Soil Conservation Service is bringing under its influence more than 51,500,000 acres of land in 41 different States. The owners and operators of this tremendous acreage are numbered by thousands. The Soil Conservation Service, therefore, has unparalleled opportunity to carry the gospel of wildlife conservation to those in a position really to do something about it - the land owners. It is greatly to be hoped that the Service will make the utmost of its opportunities.

The new Section of Wildlife Management is headed by Ernest G. Holt. Mr. Holt is assisted in the Washington office by Dr. William R. Van Dersal. It is contemplated that the field organization will eventually be directed by 11 Regional Biologists. Those so far appointed are: Warren W. Chase, Des Moines, Iowa, Verne E. Davison, Huron, S. Dak., E. D. Eaton, Albuquerque, N. Mex., Lawrence E. Hicks, Zanesville, Ohio, M. S. McMurtrey, Amarillo, Texas, and Ross O. Stevens, Spartanburg, S. Car.

The Forest Service, U. S. Department of Agriculture, announces the inauguration of a Division of Wildlife Management effective June 1, 1936. Dr. Homer L. Shantz, President of the University of Arizona, has been selected as its first Chief. Dr. Shantz employed previously in the Department (Bureau of Plant Industry, 1908-1926), is an outstanding ecologist and plant geographer. A preliminary announcement by the Forest Service says, "Dr. Shantz will launch an expansive program of critical analyses of conditions, resources, and demands of wildlife on the National forest areas. Under his direction, there will be developed wider management plans for wildlife in coordination with other National forest resources."

The Brewster Medal and honorarium given biennially by the American Ornithologists' Union for the most important published work on American Ornithology issued during the preceding six years was awarded, at the annual meeting in Toronto, Canada, October 1935, to Herbert L. Stoddard for "The Bobwhite Quail, Its Habits, Preservation, and Increase," published in 1931.

Charles H. Batton, in charge of the biological survey unit, Iowa State Planning Board, gives us permission to publish the following information on a doubtful point, the value of osage orange. "In our state-wide upland game feeding program last year, we discovered that we were able to maintain quail on osage orange or hedge apples. In Marion County we fed 2,467 quail by actual count at 175 different feeding stations from middle December until the latter part of February on this feed alone. There is no doubt in my mind, after this demonstration, that the hedge apple provides both solid and salad food to the birds, if crushed and fed under protection. The birds, of course, secured some other feed, but very little as in this particular section of the State the weed seed did not mature due to the drought."

Iowa State College (Ames) has issued a folder "Opportunity in Wildlife Management" which contains matter appropriate to the title, and indicates the courses available in the College that bear on wildlife management, a subject in which a student may major, and also pursue postgraduate work leading to higher degrees.

Buffalo grass may be restored.- "Field experiments at the Hays branch of the Kansas Experiment Station indicate that it may be possible to correct the mistake of the white men who have plowed up too much of the buffalo grass sod, in their zeal to grow wheat and other cultivated crops," says John H. Parker, Bureau of Plant Industry agronomist stationed at Kansas State Agricultural College, in the Agricultural Leaders' Digest for November.

"D. A. Savage, assistant agronomist, reports success in transplanting small pieces of buffalo grass sod in well-prepared soil at intervals of 3 to 4 feet. Such pieces will spread and cover all intervening spaces by the end of the third season, while from 20 to 50 years are required for buffalo grass to become reestablished naturally on abandoned farm land...There is a widespread demand for information on the subject of renewing native grasses on land found to be unprofitable or unsatisfactory for the production of cultivated crops. Many farmers, experiment station agronomists and government experts in land utilization now recognize the mistake made in plowing under so much of the native grass..."

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